DEPARTMENT OF ~~LABOR AND ECONOMIC GROWTH~~ **LICENSING AND REGULATORY AFFAIRS**

DIRECTOR'S OFFICE

CONSTRUCTION SAFETY STANDARDS

Filed with the Secretary of State on March 14, 2013

~~These rules take effect 7 days after filing with the Secretary of State~~

These rules become effective immediately upon filing with the Secretary of State unless adopted under section 33, 44, or 45a(6) of 1969 PA 306. Rules adopted under these sections become effective 7 days after filing with the Secretary of State.

(By authority conferred on the director of the department of ~~labor and economic growth~~ **licensing and regulatory affairs** by sections 19 and 21 of 1974 PA 154,and Executive Reorganization Order Nos. 1996-2**, 2003-1, 2008-4, and 2011-4, MCL 445.2001, 445,2011, 445.2025, and 445.2030** ~~and 2003-18, MCL 408.1019, 408.1021, 445.2001, and 445.2011~~)

R 408.40709, R 408.40711, R 408.40712, R 408.40721, R 408.40722, R 408.40743, R 408.40744, R 408.40746, R 408.40751, R 408.40761, of the Michigan Administrative Code are amended and R 408.40714, R 408.40729, and R 408.40742 of the Code are rescinded, as follows:

PART 7. WELDING AND CUTTING

GENERAL PROVISIONS

R 408.40709 **Adopted and referenced standards.** ~~Adoption of standards by reference.~~
Rule 709. (1) The standards specified in this rule, except for the standards specified in subrule (2) of this rule, are adopted by reference.
(a) The following standards are available from Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado, 80112, USA, telephone number: 1-800-854-7179 or via the internet at web-site: http://global.ihs.com; at a cost as of the time of adoption of these rules, as stated in this subrule:
(i) American National Standard Institute Standard ANSI/AWS Z49.1, Safety in Welding and Cutting and Allied Processes, 1973 edition. Cost: ~~$80.00~~ **$96.00**.
(ii) American National Standard Institute Standard ANSI/ASA B57.1, Compressed Gas Cylinder Valve Outlet and Inlet Connections, 1965 edition. Cost ~~$25.00~~ **$29.00.**
(b) The following standards are available from the National Fire Protection Association, Charles S Morgan Technical Library, 1 Batterymarch Park, P.O. Box 9101, Quincy, Massachusetts, 02269-9101, USA; telephone number: 617-984-7445; or via the internet at web-site: www.nfpa.org/library or e-mail at Library@NFPA.org; at a cost as of the time of adoption of these rules, as stated in this subrule.
~~(i) National Fire Protection Association NFPA 70 National Electrical Code, Article 630 Electric Welders, 1978 edition. Cost: $7.50.~~
(i) ~~(ii)~~ National Fire Protection Association NFPA 50 Standards for Bulk Oxygen Systems at Consumer Sites, 1974 edition. Cost: ~~$7.50~~ $**27.00**.
(ii) ~~(iii)~~ National Fire Protection Association NFPA 58 Liquefied Petroleum Gas Code, 1974 edition. Cost: ~~$39.50~~ $**27.00**.
(c) Code of Federal Regulations, Title 49, Transportation, Part 186-199 stock number 869-048-00199-9 is available from the U.S. Government Bookstore, Washington DC, 20402; telephone number: 888-293-6498; or via the internet at web-site: http://bookstore.gpo.gov; at a cost, as of the time of adoption of these rules, of ~~$5.00~~ **$4.00**.
These standards are also available for inspection at, and purchase from, the Michigan Department of ~~Labor and Economic Growth~~ **Licensing and Regulatory Affairs**, MIOSHA Standards Section, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909-8143.
(2) The following Michigan occupational safety and health standards are referenced in these rules. Up to 5 copies of these standards may be obtained at no charge from the Michigan Department of ~~Labor and Economic Growth~~ **Licensing and Regulatory Affairs**, MIOSHA Standards Section, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan, 48909-8143 or via the internet at web-site: www.michigan.gov/mioshastandards. For quantities greater than 5, the cost, as of the time of adoption of these rules, is 4 cents per page
(a) Construction Safety Standard Part 1 General Rules, R 408.40101 **to R 408.40134** ~~et seq~~.
(b) Construction Safety Standard Part 6 Personal Protective Equipment, R 408.40601 **to R 408.40641** ~~et seq~~.
(c) Construction Safety Standard Part 45 Fall Protection, R 408.44501 **to R 408.44502** ~~et seq~~.
(d) General Industry Safety Standard Part 12 Welding and Cutting, R 408.11231 to R 408.11252.

R 408.40711 Employer and employee responsibilities.

Rule 711. (1) An employer shall do all of the following:

(a) Assure that each employee has received safety training in the use of equipment for welding operations and instruction in the rules of this part before allowing the employee to use the equipment.

~~(b) Provide protection to an employee against toxic or hazardous materials or deficient oxygen, as prescribed by the department of labor and economic growth.~~

~~(c) Assure that employees wear personal protective equipment as required in R 408.40751.~~

(b) ~~(d)~~ Assure that an employee in charge of the operation of oxygen or fuel gas supply equipment or of oxygen or fuel gas systems is instructed and judged competent for this work by the employer before being left in charge. Rules and instructions covering the operation and maintenance of oxygen or fuel gas distribution piping systems shall be readily available.

~~(2) An employee shall do all of the following:~~

~~(a) Use welding and cutting equipment as trained and authorized.~~

~~(b) Use the protective equipment required by the hazard and this part.~~

~~(c) Not tamper with safety devices.~~

~~(d) Report to the supervisor any faulty or defective equipment.~~

(2) ~~(3)~~ Welding operations shall not be permitted in the following situations:

(a) In an area not authorized by the building or structure occupant.

(b) In a sprinklered building while the sprinkler system is impaired, unless a fire watch is provided.

(c) In the presence of a potentially explosive atmosphere, such as mixtures of flammable gases, vapors, liquids, or dusts with air.

R 408.40712 Requirements generally.

Rule 712. ~~(1) A mixture of fuel gas with air or oxygen shall not be permitted except when consumed by a burner or torch.~~

(1) ~~(2)~~ Only apparatus designed for use with fuel gas or oxygen, such as a torch, regulator, pressure-reducing valve, acetylene generator, and manifold, shall be used for welding or cutting.

~~(3) The total volume of acetylene used per hour shall not exceed 1/7 of the total volume of the acetylene supply in the system.~~

(2) ~~(4)~~ Fuel gas, oxygen, or compressed air shall not flow from a cylinder or manifold through a torch or other device equipped with a shutoff valve unless the pressure is reduced by a regulator attached to the cylinder or manifold.

(3) ~~(5)~~ An oxygen cylinder, fuel gas cylinder, cylinder valve, coupling regulator, hose, and apparatus shall be kept in good operating condition and shall be kept free from defects.

(4) ~~(6)~~ An oxygen cylinder, fuel gas cylinder, cylinder valve, coupling regulator, hose, and apparatus shall be kept free from oily or greasy substances and shall not be handled with oily hands or gloves. A jet of oxygen shall not be permitted to strike oily surfaces or greasy clothes and shall not be permitted to enter a fuel, oil, or other storage tank.

(5) ~~(7)~~ Oxygen shall only be used for welding or cutting.

(6) ~~(8)~~ Welders shall place welding cable, hose, and other equipment so that it is clear of passageways, ladders, and stairways, or shall assure that it is protected against damage and does not create a hazard to an employee.

~~(9) After welding operations are completed, a sign or other means shall be used to provide a warning of the hot metal.~~

R 408.40714 ~~Warning tags and labels.~~ **Rescinded.**

~~Rule 714. (1) A storage container of welding materials with filler metals or fusible granular materials shall carry a special label which shall read as follows:~~

~~CAUTION~~
~~Welding may produce fumes and gases hazardous to health.~~
~~Use adequate ventilation.~~
~~See American national standards institute standard ANSI/AWS Z49.1, 1973 edition,~~
~~Safety in Welding and Cutting and Allied Processes.~~

~~(2) A storage container of brazing filler metals containing cadmium in significant amounts shall carry a special label which shall read as follows:~~

~~WARNING~~
~~Contains cadmium–poisonous fumes may be formed on heating.~~
~~Do not breathe fumes.~~
~~Use only with adequate ventilation such as fume collectors, exhaust ventilators, or air-supplied respirators.~~
~~See American national standards institute standard ANSI/AWS Z49.1, 1973 edition,~~
~~Safety in Welding and Cutting and Allied Processes.~~
~~If chest pain, cough, or fever develops after use, contact physician immediately.~~

~~(3) A storage container of brazing or gas welding fluxes containing fluorides shall have a special label which shall read as follows:~~

~~CAUTION~~
~~Contains fluorides.~~
~~This flux, when heated, gives off fumes that may irritate the eye, nose, and throat.~~
~~Avoid fumes–use only in well-ventilated spaces.~~
~~Avoid contact of flux with eyes or skin.~~
~~Do not take internally.~~

CYLINDERS

R 408.40721 Cylinders manufacturing, labeling, periodic testing, and marking.
Rule 721. (1) A cylinder shall be manufactured, labeled, and periodically tested in accordance with the specifications of the federal department of transportation requirements published in 49 C.F.R. Part 178, Subpart C, Specification for Cylinders, which are adopted by reference in R 408.40709.
(2) A cylinder shall be legibly marked with either the chemical or trade name. Marking shall be by stenciling, stamping, or labeling and shall not be tampered with or be readily removable. Whenever practical, the marking shall be located on the shoulder of the cylinder.
(3) An unlabeled cylinder shall not be used.
~~(4) An empty cylinder shall be so marked at the time of depletion.~~

R 408.40722 Storage.
Rule 722. (1) An oxygen cylinder shall be stored not less than 20 feet from fuel gas cylinders or any highly combustible material, such as, but not limited to, oil, grease, excelsior, flammable gas, or a source of ignition, or shall be separated from the material by a noncombustible wall not less than 5 feet (1.6 meters) high which has a fire resistance rating of 1 hour.
(2) A cylinder shall be stored away from any source of heat **more than** ~~in excess of~~ 125 degrees Fahrenheit.
(3) A cylinder, whether full or empty, in storage or during shipment, or with the regulator removed, shall have the valve closed and the cap connected in place if a cap is provided in the design, or shall be otherwise protected.
~~(4) Storage shall be set up to ensure first in, first out usage.~~
~~(5) A cylinder storage area shall be posted with the names of the individual gases stocked, and a warning shall be posted against tampering by an unauthorized employee. An assigned storage area shall be located where a cylinder will not be knocked over or struck by a passing or falling object.~~
(4) ~~(6)~~ Where different gases are stored, they shall be grouped by types. Groupings shall separate the fuel gases from the oxidizing gases as specified in subrule (1) of this rule.
(5) ~~(7)~~ A storage area for cylinders shall be well ventilated.
(6) ~~(8)~~ A cylinder shall not be stored in basements or pits.
~~(9) All storage of fuel gas or oxygen within a building shall be in accordance with the specifications of National Fire Protection Association Standard NFPA 58, 1974 edition Liquefied Petroleum Gas Code, which is adopted by reference in R 408.40709.~~
(7) ~~(10)~~ Where a liquid or gaseous oxygen system is used to supply gaseous oxygen for welding and cutting and the system has a storage capacity of more than 20,000 cubic feet (560 cubic meters), measured at 14.7 psia and 70 degrees Fahrenheit, including unconnected reserves at the site, the system shall be as prescribed in National Fire Protection Association Standard NFPA 50, 1974 edition, Standards for Bulk Oxygen Systems at Consumer Sites, which is adopted by reference in R 408.40709.

R 408.40729 ~~Manifolding.~~ **Rescinded.**
~~Rule 729. Manifolding used for a welding operation shall be as prescribed in the general industry safety standard Part 12 Welding and Cutting, R 408.11231 to R 408.11252.~~

ARC WELDING AND CUTTING

R 408.40742 ~~Open circuit and no-load voltages of arc welding machines.~~ **Rescinded.**
~~Rule 742. (1) When an arc welding machine is operated without being connected to a load, the open circuit voltage shall not exceed the values shown in table 1 when rated voltage is applied to the primary winding or when a generator-type arc welding machine is operating at maximum rated no-load speed.~~
~~(2) When welding and cutting processes require valves of open circuit voltages higher than 100, insulation or other means shall be provided to prevent the operator from making accidental contact with the high voltage.~~
~~(3) Equipment working through resistors from DC trolley voltages or 250 to 600 volts shall have a protective device for automatically disconnecting the power during arc off periods.~~

~~(4) Automatic control devices for reducing no-load voltage below 50 volts shall be provided where AC welding is to be done under wet conditions that could provide a shock hazard.~~
~~(5) Table 1 reads as follows:~~

~~TABLE 1~~
~~Maximum Open Circuit Voltages of Welding Machines~~
~~Welding current Maximum open circuit (no-load)~~
~~Manual & semi~~
~~automatic machines Voltage~~
~~Automatic~~
~~machines~~
~~ac 80 rms 100 rms~~
~~dc>10% Ripple~~
~~voltage 80 rms 100 average~~
~~dc<10% Ripple~~
~~voltage 100 average 100 average~~

R 408.40743 Design requirements for arc welding machines.
Rule 743. (1) A controller integrally mounted in an electric motor-driven welding machine shall have the capacity for carrying rated motor current and shall be capable of making and interrupting stalled rotor current of the motor.
~~(2) Control apparatus shall be enclosed except for the operating wheels, levers, or handles. The handles and wheels shall be large enough to be grasped by a gloved hand.~~
(2) ~~(3)~~ Input power terminals, tap change devices, and live metal parts connected to input circuits shall be completely enclosed and shall be accessible only by use of tools.
(3) ~~(4)~~ Welding lead terminals shall be protected from accidental electrical contact by personnel or metal objects. If a welding lead terminal normally used for connection to the work is connected to a grounded enclosure, it shall be done by a conductor not less than 2 sizes smaller than the grounding conductor and it shall be so marked.
(4) ~~(5)~~ Portable control devices, such as push buttons, shall not be connected to an AC circuit of more than 120 volts. Exposed metal parts of a portable control device operating above 50 volts shall be grounded.
(5) ~~(6)~~ Auto transformers or AC reactors shall not be used to draw welding current directly from any AC power source having a voltage of more than 80 volts.

R 408.40744 Installation.
Rule 744. (1) The frame or case of a welding machine shall be grounded, unless the manufacturer does not recommend it.
(2) The work on which the operator welds shall be grounded. A wire used to ground a workpiece shall be capable of carrying the full welding current. Connections of the ground shall be mechanically sound and strong. When a single ground return cable services more than 1 unit, the safe current-carrying capacity of the cable shall equal or exceed the total maximum output capacities of all units which it services.
(3) A conduit containing an electrical conductor shall not be used for completing a work-lead circuit.
~~(4) An arc welder shall meet the applicable requirements of article 630, Electric Welders of the National Fire Protection Association NFPA 70 National Electrical Code, 1978 edition, which is adopted by reference in R 408.40709.~~
(4) ~~(5)~~ A pipeline in service shall not be used as a permanent part of a work-lead circuit, but may be used during construction, extension, or repair if current is not carried through threaded joints, flanged bolted joints, or caulked joints and if special precautions are used to avoid sparking at the connection of the work-lead cable.
(5) ~~(6)~~ Chains, wire ropes, cranes, hoists, and elevators used for carrying loads shall not be used to carry a welding current.
(6) ~~(7)~~ A welding cable shall be protected against damage, entanglement, or contact with power supply or high-tension wires.
(7) ~~(8)~~ A welding machine that is not provided with a controller or disconnect switch as an integral part shall have a controller or disconnect switch with overload protection provided. A disconnect switch with overload protection or overload disconnect protection, or equivalent, shall be provided for each outlet used by a portable welding machine, unless the machine is equipped with a disconnect switch and overload protection.
(8) ~~(9)~~ The rated current-carrying capacity of the supply conductors for individual machines shall not be less than the rated primary current for the welding machine. The rated current-carrying capacity of the conductors for a group of welding machines may be less than the sum of the rated primary current of the welding machines supplied. The conductor rating shall be determined in each case according to the machine loading based on the use to be made of each welding machine and the allowance permissible if all the machines supplied by the conductor will not be in use at the same time.
(9) ~~(10)~~ Where a welding machine is working sufficiently close to another machine so that a welding operator is likely to touch the exposed parts of more than 1 electrode holder simultaneously, the machine shall be connected so as to minimize shock hazard as follows:

(a) DC machine shall be connected with the same polarity.
(b) AC machine shall be connected to the same phase of the supply circuit and with the same instantaneous polarity.
(10) ~~(11)~~ A current-carrying part passing through the portion of the holder that the employee grips by hand and the outer surface of the jaws of the holder shall be insulated against the maximum voltage encountered to ground.

R 408.40746 Operation.
Rule 746. (1) Engine fuel, cooling water, or shielding gas shall not be allowed to leak.
(2) A welding machine shall be disconnected when being moved and shall be turned off when not in use.
(3) Electrodes shall be retracted or removed when not in use. Electrode holders not in use shall be placed so that they cannot make electrical contact with an employee, fuel, gas tanks, or conducting objects.
(4) A welder shall not let live electrodes or holders touch his bare skin or damp clothing. When arc welding is performed in wet conditions or under a condition of high humidity, the welder shall be protected against electric shock.
(5) Electrode holders shall not be cooled by immersion in water.
(6) Welding shall not be permitted where fumes of chlorinated hydrocarbons are present or will reach or be drawn into the atmosphere surrounding the welding operation.
(7) Before starting an arc welding operation, the welder shall do all of the following:
(a) **Assure** ~~Make sure~~ the work lead is secured to the work.
(b) **Assure** ~~Make sure~~ the magnetic work clamps are free of spatter on the contact surfaces.
(c) Spread out the welding cable, if necessary, to prevent overheating and damage.
(d) **Assure** ~~Make sure~~ grounding connections are secured to a good ground.
(e) **Assure** ~~Make sure~~ the required switching equipment for shutting down the machine has been provided.
(8) A welder shall not curl or loop welding cable around his **or her** body.
~~(9) An employee working in the vicinity of arc welding operations and exposed to the direct rays of the arc shall be shielded by a noncombustible or flameproof screen provided by the employer, at no expense to the employee.~~
~~(10) When a welding machine used indoors is powered by an internal combustion engine, the atmosphere indoors to which an employee is exposed shall be maintained in accordance with the requirements of the department of labor and economic growth.~~

PERSONAL PROTECTIVE EQUIPMENT

R 408.40751 Personal protective equipment.
Rule 751. (1) Face and eye protection shall be worn by a welder when performing welding operations and by other employees exposed to a risk of injury from spatter or flash, or both. The protective devices shall be provided for as prescribed in construction safety standard Part 6 Personal Protective Equipment, R 408.40617, R 408.40623, and R 408.40624.
(2) Welding gloves shall be provided for by the employer, at no expense to the employee, and shall be worn to protect the hands and wrists.
~~(3) When necessary, such as when performing overhead arc welding, sleeves shall be provided for by the employer, at no expense to the employee, and shall be worn to protect the arms when arc welding.~~
~~(4) Leather shoes or other appropriate apparel that cover the ankle shall be worn. The employee shall provide leather shoes or other appropriate apparel unless specifically otherwise provided for in a collective bargaining agreement or other employer-employee agreement.~~
(3) ~~(5)~~ Other protective devices, such as, but not limited to, body protection, chaps, and curtains shall be provided for by the employer, at no expense to the employee, and shall be used when an employee is exposed to a risk of injury by flash burn, sparks, and foreign bodies.

GENERAL FIRE RULES

R 408.40761 Fire precautions.
Rule 761. (1) Welding operations shall not be performed within 50 feet of explosives, stored cylinders, or stored fuel. Combustible and flammable materials located within 35 feet of a welding operation shall either be removed or covered with fire-resistant material.
(2) Cracks or openings through which sparks could pass in the floor or wall that are within 35 feet of a welding operation shall be covered with a fire-resistant material.
(3) A wood floor within 10 feet of a welding operation shall be protected by either wetting down, covering with sand, or covering with a fire-resistant material.
(4) A minimum of 1 2A-10BC portable fire extinguisher shall be immediately available to the work area during welding operations.
~~(5) Conveyor and exhaust systems within 35 feet of a welding operation that might carry sparks or hot slag shall be protected or shut down.~~

(5) ~~(6)~~ An employer shall designate a person as responsible for fire safety during a welding operation where a fire could start or where 1 of the following conditions exists:
(a) Appreciable combustible and flammable materials are more than 35 feet from a welding operation but are easily ignited.
(b) Combustible and flammable material is adjacent to the opposite side of a metal partition, wall, ceiling, or roof that is likely to ignite by conduction or radiation.
(c) If there is a possibility that a smoldering fire may have started, the person shall remain at the scene of the work for not less than 30 minutes after the welding operation has stopped. ~~Such personnel~~ **Personnel** shall be instructed as to the specific anticipated fire hazards and how the firefighting equipment provided is to be used.
(6) ~~(7)~~ The connection, by welding, of branches to a pipeline carrying a flammable substance shall be performed in accordance with the regulations of the department of transportation, 49 C.F.R. Part 192, Minimum Federal Safety Standards for Gas Pipelines, which are adopted by reference in R 408.40709.
(7) ~~(8)~~ Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.
~~(9) Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable, they shall be stripped from the area to be heated to prevent ignition.~~